

REMARKS

Claims 1-18 are in the application. Claims 19 and 20 have been canceled without prejudice in response to a restriction requirement. Claim 18 has been amended. No new matter has been added.

The present invention is a shaft for light weight golf clubs having alternating layers of straight and angled fibers which is 35-50 percent lighter than conventional shafts while providing the same outer diameter and the same characteristics as conventional shafts such as flexural rigidity, flexural strength, torsional rigidity, torsional strength and crushing strength.

1. Claim rejections under 35 U.S.C. §112, second paragraph

Claim 18 stands rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim that which the applicant regards as the invention. The Examiner states claim 18 lacks sufficient antecedent basis in the specification for the limitation of "organic, inorganic **and** metal reinforcing fibers." Applicant respectfully traverses the rejection. The composition of the reinforcing fibers used in the present invention is disclosed in the specification at page 9, lines 1-10. Specific examples of exemplary fibers, representing each of the three classes listed, are also disclosed. In addition, the specification indicates that, contrary to the conventional technology, the reinforcing fibers do not necessarily need to be partially or entirely comprised of high-elasticity reinforcing fibers. Applicants respectfully submit that this disclosure provides sufficient antecedent basis for the original limitation recited in claim 18 regarding the composition of the reinforcing fibers of the

present invention. However, in order to expedite prosecution, Applicants have amended claim 18. Applicants respectfully request reconsideration of the rejection of claim 18 under 35 U.S.C. § 112, second paragraph, in light of the above amendment and remarks.

2. Double Patenting under 37 C.F.R. 1.75

Claim 3 is objected to under 37 C.F.R. 1.75 as being a substantial duplicate of claim 4. Applicant respectfully traverses the objection. Applicant has the right to restate the invention by plural claiming the invention in a reasonable number of ways. A mere difference in scope between claims is enough to avoid a rejection for duplicate claims or double patenting. MPEP § 703(k). Claims 3 and 4 differ in that claim 3 includes the limitation that reinforcing fibers of the second angled layer are oriented at an angle of from 60 to 75 degrees with respect to the longitudinal direction of the golf shaft. In contrast, claim 4 includes the limitation that reinforcing fibers of the second angled layer are oriented at an angle of from 65 to 70 degrees, which is a narrower range than that claimed in claim 3. This difference in orientation of the second angled layer represents a difference in scope between claims 3 and 4 that is sufficient to avoid a rejection under 37 C.F.R. 1.75. Applicants respectfully request withdrawal of the rejection of claim 3 under 37 C.F.R. 1.75 in light of the above.

3. Claim rejections under 35 U.S.C. §103

Claims 1-2, 5-6, 9-10, 13-14 and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over Jackson in view of Turner, Kobayashi '504 and Eberle.

The Examiner asserts that: 1. Jackson discloses a first angled layer, a first straight layer, a second angled layer and a second angled layer, each layer being made of fiber reinforced composite material extended over the length of a shaft; 2. fibers of a second angled layer are oriented at an approximate 45° angle relative to a longitudinal direction of a shaft; 3. the layer is organic from 0.1 mm to 4 mm thick; 4. the weight of the shaft is approximately 50 grams; and 5. the golf shaft possess comparable properties of flex, shear and torsional resistance to that of the present invention. The Examiner concludes that it would have been obvious to one of ordinary skill in the art to design a club having sufficient strength to play golf and fit the swing strength of a player and would have selected a suitable torsional strength and crush strength of at least 120 kfg x m x degrees and 10 kg/10 mm, respectively.

The Examiner asserts that although Jackson does not disclose a shaft weight of 30-40 grams, a torsional strength of at least 120 kfg x m x degrees and a crush strength of 10 kg/10 mm, that Turner discloses less material for a shaft makes it more flexible. In addition, the Examiner asserts that Kobayashi discloses that for weak players who have a low head speed, having more flexure and torsion is more suitable. Furthermore, Eberle discloses that shaft length depends on a height of a player.

The Examiner concludes that in light of these references, it would have been obvious to modify the shaft of Jackson to: 1. Have a shaft that weighed 30-40 grams due to less material used in manufacturing a shaft, in order to provide a shorter shaft to a shorter golfer, and/or to provide a shaft to a golfer who requires less stiffness due to a weak swing; 2. have a torsional strength as defined by the claims in order to minimize the amount of inaccuracies added to the ball at impact due to torsional flexing; and, 3. have a crush strength as defined by the claims in

order to minimize the possibility of a shaft breaking when a club impacts the ground when hitting a ball. Applicants respectfully traverse the rejection.

In order to establish a case of *prima facie* obviousness, three criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally the prior art reference(s) must teach or suggest all the claim limitations. MPEP §2142.

Applicants respectfully submit that the combination of references as proposed by the Examiner, does not teach or suggest all of the claim limitations of the present invention. Specifically, the cross sectional structure of the fiber reinforced composite shaft of the present invention is four distinct layers, comprising sequentially: a first straight layer, a first angled layer, a second straight layer and a second angled layer. As a result of this design, the shaft formed from these layers has four distinct layers without repeating the pattern. This design is illustrated in Fig. 1(b), which shows a cross section of the fiber reinforced composite shaft of the present invention. The dimension and weight of the shaft of the present invention may be adjusted by adjusting the thickness of one or more of the four separate layers. Claim 1 has been amended to more clearly define the invention as described supra.

In contrast, the shaft formed in Jackson consists of a single multilayer laminate in a spiral wrap. Jackson discloses a shaft formed from spirally wrapping a four layer laminate concentrically four or more times to form a tube. See Fig. 3. Thus, the cross sectional pattern of Jackson comprises multiple windings of a four layered pattern. In other words, the cross sectional pattern of the shaft of Jackson includes a coiled four layer laminate. See column 4, lines 13-

Disagree
✓ not
claimed

Agree

19. The dimension and weight of the Jackson shaft is adjusted by spirally winding more or less layers of the laminate. See column 3, lines 16-25. Applicants respectfully submit that the Jackson reference, for all that it discloses, does not teach or even suggest a golf shaft made from four distinct layers which neither form a single flat laminate structure nor coil and overlap one another.

*either does
claims.*

The missing element is not disclosed in any of the other cited references. In Turner a golf club grip and a shaft which extends into the grip is disclosed. The reference teaches certain materials used in composition of a golf club shaft. See column 4, lines 33 to 56. However, the Turner reference, for all that it discloses, does not teach or even suggest a particular design of a golf club shaft. In Kobayashi '504, a device for measuring a stiffness of a golf-club shaft is disclosed. The reference neither teaches nor suggests a particular design of a golf club shaft. In Eberle, a pendulum type putter is disclosed having a grip with two flats that lie perpendicular to the plane of the face on the head of the putter. This reference neither teaches nor suggests a particular design of a golf club shaft. Applicant respectfully submits that the limitation of different layers being sequentially and concentrically wound to form a golf shaft is not disclosed in any of the prior art references considered alone or in any combination.

*disagree
either does
claims*

In conclusion, the present invention as claimed in independent claim 1 recites a structural design for a golf club shaft that is neither taught nor suggested in any of the cited prior art references, either alone or in combination. Consequently, the present invention as claimed in independent claim 1 is not obvious in light of the prior art references. Applicants respectfully submit that if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03. Dependent claims 2, 5-6, 9-10, 13-14 and 18, being dependent upon and further limiting independent claim

1, should also be allowable for that reason, as well as for the additional recitations each contains. Reconsideration of the rejection of claims 1-2, 5-6, 9-10, 13-14 and 18 under 35 U.S.C. § 103(a) is respectfully requested in light of the above.

Claims 3-4, 11-12 and 15-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Jackson in view of Turner, Kobayashi '504 and Eberle as applied to claims 1-2, 5-6, 9-10, 13-14 and 18 above, further in view of Hedrick and Cheng. The Examiner observes that Jackson does not disclose fibers of a second angled layer being oriented at an angle range of from 60 to 75 degrees relative to a longitudinal direction of a shaft. The Examiner asserts that Hedrick discloses that angled fibers provide torsional stiffness and fibers parallel to a longitudinal axis of a shaft provide longitudinal stiffness. The Examiner asserts that Cheng discloses angled fibers in a range of 60-75 degrees. The Examiner concludes it would have been obvious to one of ordinary skill in the art to modify the shaft of Jackson to have fibers oriented as defined by the claims for the second angled layer in order to provide a shaft with more torsional stiffness and less longitudinal stiffness for a golfer who prefers this type of shaft due to the golfer's swing. Applicants respectfully traverse the rejection.

Applicants submit that the arguments raised regarding rejection of independent claim 1 under 35 U.S.C. § 103(a) that distinguish that claim over the prior art are applicable in this rejection as well. Applicants respectfully submit that if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03. Dependent claims 3-4, 11-12 and 15-16, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations each contains. Reconsideration of the rejection of claims 3-4, 11-12 and 15-16 under 35 U.S.C. § 103(a) is respectfully requested in light of the above.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Jackson in view of Turner, Kobayashi and Eberle as applied to claims 1-2, 5-6, 9-10, 13-14 and 18 above, and further in view of Cecka. The Examiner asserts that Cecka discloses a tapered shaft having a tip end wall thickness substantially twice the thickness of a butt end wall thickness. The Examiner concludes it would have been obvious to modify the shaft of Jackson to have each layer twice the thickness at the tip end compared to the butt end in order to have a tapered shaft yet a strong tip end to prevent the tip end from fracturing. Applicants respectfully traverse the rejection.

Applicants submit that the arguments raised regarding rejection of independent claim 1 under 35 U.S.C. § 103(a) that distinguish that claim over the prior art are applicable to this rejection as well. Applicants respectfully submit that if an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. MPEP § 2143.03. Dependent claim 18, being dependent upon and further limiting independent claim 1, should also be allowable for that reason, as well as for the additional recitations each contains.

Reconsideration of the rejection of claim 18 under 35 U.S.C. § 103(a) is respectfully requested in light of the above.

In view of the foregoing, the application is now believed to be in proper form for allowance.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 13-4550.

If the Examiner believes that a telephone conference would be of value, he is requested to call the undersigned counsel at the number listed below.

Respectfully Submitted,



Joy I. Farber

Reg. No. 44,103

Attorney for Applicants

145 North Fifth Ave.
Mount Vernon, New York 10550
(914) 667-6755

Date: *May 12, 2000*